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10/061,886	01/31/2002	Yoshiteru Watanabe	JP920000415US1	8855

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EXAMINER	
MAK, ROBIN C	

ART UNIT	PAPER NUMBER
2674	

DATE MAILED: 09/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/061,886	WATANABE ET AL.	
	Examiner	Art Unit	
	Robin Mak	2674	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 06 February 2004 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 5/17/2002.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 02/06/2001. It is noted, however, that applicant has not filed a certified copy of the 2001-030240 application as required by 35 U.S.C. 119(b).

Drawings

2. The drawings are objected to because in Figures 8-12, the rows and columns of the pixel array should be labeled, clearly indicating the axis representing rows and columns. The examiner has determined (after careful inspection) that upon rotating the drawing sheet 90 degrees clockwise (causing the arrow in the center of drawing sheet to point left and right), the x-axis (horizontal) represents rows and the y-axis (vertical) represents columns. Appropriate correction (labeling of rows and columns) is required.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. **Claim 11** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 11 fails to further limit claim 9 (its parent claim), instead reciting the same (or fewer) claim limitations in alternative language. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 6, 9-11, and 15** are rejected under 35 U.S.C. 102(e) as being anticipated by Nishimura et al. (hereinafter "Nishimura"; US 6,400,350).

As pertaining to **claim 6**, Nishimura discloses a liquid crystal display device comprising: a liquid crystal display cell having a plurality of pixels (Fig. 5, ref. num. 5) arrayed in 12 rows and 14 columns, and having a plurality of scanning lines (Fig. 5, ref. num. 4) and signal lines (Fig. 5, ref. num. 3) respectively for transmitting scanning signals and display signals to each of the pixels (col. 1, line 40 – col. 2, line 6); a scanning signal supply circuit (Fig. 5, ref. num. 2) for supplying the scanning signals to the plurality of scanning lines; a display signal supply circuit (Fig. 5, ref. num. 1) for supplying the display signals of different polarity to adjacent signal lines; and a control unit (Fig. 5, ref. num. 8) for supplying a polarity instruction signal to the display signal supply circuit (col. 6, lines 18-32 and col. 6, line 54 – col. 7, line 11) based on a random number of pixel rows constituting one pixel row group in one display frame (col. 9, lines 17-52).

Nishimura teaches that the number of pixel rows constituting one pixel row group is determined at random by the polarity control unit (Fig. 5, ref. num. 8). This is equivalent to the polarity control unit generating a random number for a pixel positioned in a predetermined column in each pixel row (i.e., it is only necessary to specify the polarity for one pixel in a pixel row – the polarity of each adjacent pixel in that pixel row is alternatively arranged). For example, as per Fig. 5 of Nishimura, the predetermined column could be the first column of pixels from the left. The first three row pixels from the top in this column are negative, corresponding to a randomly generated number of

"0." The next four row pixels in this column are positive, corresponding to a randomly generated number of "1." The polarity of subsequent pixel row groups are similarly determined at random by the polarity control unit.

As pertaining to **claim 9**, Nishimura discloses a liquid crystal display device of an active matrix type having an element (thin film transistors) for applying a drive voltage to a liquid crystal material (col. 1, lines 8-16), the liquid crystal display device comprising: a liquid crystal display cell having a plurality of pixels (Fig. 5, ref. num. 5) arranged in a dot matrix form and the liquid crystal material sealed therein (col. 1, lines 8-16); a control unit (Fig. 6, ref. num. 6) for transmitting generated random numbers (col. 9, line 17 – col. 10, line 10); and a polarity instruction unit (Fig. 5, ref. num. 8) for applying a polarity corresponding to each of the random numbers received from said control unit to a predetermined pixel, and for instructing positive and negative polarities of other pixels present in the same row to be alternately arrayed by using the polarity of the predetermined pixel as a reference.

Nishimura teaches that the number of pixel rows constituting one pixel row group is determined at random by the random number generator control unit (Fig. 6, ref. num. 6) and the polarity instruction unit (Fig. 5, ref. num. 8). This is equivalent to applying a random polarity to a predetermined pixel (as discussed in the preceding claim 6 rejection). Furthermore, it can be seen from Fig. 5 that the polarity of adjacent pixels in the same row are alternately arrayed using the polarity of the predetermined pixel as a reference.

As pertaining to **claim 10**, Nishimura further teaches that the plurality of pixels are arrayed in 12 rows and 14 columns, although not limited to such dimensions (col. 1, lines 40-44). The control unit generates random numbers for each predetermined display frame (col. 9, line 17 – col. 10, line 10). It is inherent that the control unit generates *at least* 12 random numbers (one random number per reference pixel in a row) specifying to which pixel row group the reference pixel's pixel row belongs. Furthermore, it is inherent that these random numbers are generated sequentially (computations, such as random number generation, are not done *exactly simultaneously*). The polarity instruction unit (Fig. 5, ref. num. 8) then applies these random numbers received from said control unit to a predetermined reference pixel, thereby designating the row to a pixel row group.

As pertaining to **claim 11**, Nishimura teaches all of the claim limitations recited herein, and this claim is therefore rejected on the same grounds as claim 9.

As pertaining to **claim 15**, Nishimura discloses, with respect to Fig. 5, a liquid crystal display device comprising: a liquid crystal display cell having a plurality of pixels (5) arrayed in a dot matrix form; a display signal supply circuit (1) for supplying display signals to the plurality of pixels such that the polarities of the pixels constituting each row are regularly arranged (alternating between positive and negative polarities), and the polarities of pixels constituting each column are irregularly arranged (for example, traversing from top to bottom in the first column from the left, the pixel polarities consist of three negative, four positive, four negative and one positive pixel); and a scanning signal supply circuit (2) for supplying scanning signals to the plurality of pixels.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 1-5, 7, 8, 12-14, and 16-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura.

As pertaining to **claim 1**, Nishimura discloses a display device comprising: a display cell which includes a display optical element ("liquid crystal"; col. 1, lines 8-16) and displays an image by controlling light transmission based on a drive voltage applied to the display optical element (col. 1, line 56 – col. 2, line 6); and a voltage supply circuit (Fig. 5, ref. num. 8) which randomly determines a polarity of the drive voltage in a predetermined frame (col. 9, lines 17-52).

Nishimura teaches that the voltage supply circuit (Fig. 5, ref. num. 8) is a polarity control circuit that determines at random the number of pixel rows constituting a pixel row group in a predetermined frame (col. 9, lines 17-24). It is inherent that the signal specifying the polarity of a pixel row is, in fact, a drive voltage having a polarity.

Nishimura does not explicitly disclose in this embodiment that the voltage supply circuit determines a polarity of the drive voltage in a frame subsequent to the predetermined frame by reversing the randomly determined polarity.

Nishimura, however, discloses a conventional display device wherein the polarity of the drive voltage applied to each pixel is reversed for each frame to drive the display device (Figs. 20(a) and 20(b); col. 2, lines 7-18). This frame inversion technique helps to reduce liquid crystal deterioration that can occur if voltage of the same polarity is applied to the liquid crystal for extended lengths of time (col. 2, lines 7-12).

At the time of invention, it would have been obvious to someone of ordinary skill in the art to incorporate a conventional frame inversion driving method, wherein each frame succeeding an initial frame is inverted, to the display device as taught by Nishimura (Embodiment 5 – wherein the initial frame comprises a randomly generated pixel row orientation) in order to reduce liquid crystal deterioration, thereby extending the life of the display device.

As pertaining to **claim 2**, Nishimura further discloses that said display cell has a plurality of pixels (Fig. 5, ref. num. 5) arrayed in a dot matrix form having rows and columns, and said voltage supply circuit determines at random the number of pixel rows constituting a pixel row group in a predetermined frame (col. 9, lines 17-24). This is equivalent to the voltage supply circuit performing a random polarity determination in units of rows constituting the dot matrix. Nishimura teaches all of the claim limitations recited herein, and this claim is therefore rejected on the same grounds as claim 1.

As pertaining to **claim 3**, Nishimura further discloses that said voltage supply circuit supplies drive voltage such that adjacent pixels in the same row are different from each other in polarity (see Fig. 5). Nishimura teaches all of the claim limitations recited herein, and this claim is therefore rejected on the same grounds as claim 2.

As pertaining to **claim 4**, Nishimura discloses that the voltage supply circuit performs a random polarity determination for each frame (col. 3, lines 3-5 and col. 9, lines 17-52). Nishimura, as discussed in the preceding claim 1 rejection, further discloses a conventional display device wherein the polarity of the drive voltage applied to each pixel is changed for each frame to drive the display device (Figs. 20(a) and 20(b); col. 2, lines 7-18). This frame inversion technique helps to reduce liquid crystal deterioration that can occur if voltage of the same polarity is applied to the liquid crystal for extended lengths of time (col. 2, lines 7-12). These teachings suggest that, in a display driving method, the polarity of specific rows of pixels in a frame is not necessarily critical, but that the changing of the polarities of pixels in subsequent frames is critical.

Therefore, at the time of invention, it would have been obvious to someone of ordinary skill in the art to modify the voltage supply circuit as per Embodiment 5 of Nishimura to alternately repeat the random polarity determination and the polarity determination by reversal. As such, by incorporating a polarity inversion by reversal after each random polarity determination, the voltage supply circuit is able to work more efficiently and will utilize fewer system resources, while still changing the polarity of pixels in subsequent frames. This is because a polarity determination by reversal requires less computational power than polarity determination using random number generation techniques.

As pertaining to **claim 5**, Nishimura teaches all of the claim limitations recited herein, and this claim is therefore rejected on the same grounds as claim 1.

As pertaining to **claim 7**, Nishimura further discloses that the scanning signal supply circuit (Fig. 1(b), ref. num. 2) supplies each of the pixels in a first frame with a random polarity instruction signal (col. 6, lines 52-64) via the polarity control unit (Fig. 1(b), ref. num. 8b). As Figs. 1(a) and 1(b) teach, the polarity control unit may be within the scanning signal supply circuit (Fig. 1(b), ref. num. 8b), the display signal supply circuit (Fig. 1(b), ref. num. 8b), or stand alone (Figs. 1(a), 1(b) and 5, ref. num. 8). Nishimura, therefore, teaches all of the claim limitations recited herein with the exception of explicitly disclosing in this embodiment (Embodiment 5) that the scanning signal supply circuit supplies each of the pixels in a second frame with polarity reverse to that of a first frame. However, this claim limitation has been thoroughly discussed in the rejection of claim 1. Claim 7 is therefore rejected on the same grounds as claims 6 and 1.

As pertaining to **claim 8**, Nishimura further discloses a dot reversal drive mode for realizing a first frame wherein adjacent pixels in the same row have different polarities from each other (see Fig. 5). The remaining claim limitations recited herein have been thoroughly discussed in the rejection of claim 1. Claim 8 is therefore rejected on the same grounds as claims 6 and 1.

As pertaining to **claim 12**, Nishimura discloses a liquid crystal display device comprising: a liquid crystal display cell having a plurality of pixels (Fig. 5, ref. num. 5) arrayed in 12 rows and 14 columns, the plurality of pixels having a display signal polarity regularly arrayed in reference to a reference pixel in each pixel row (see Fig. 5; alternating positive and negative polarities in each pixel row), and a plurality of scanning

lines (Fig. 5. ref. num. 4) and signal lines (Fig. 5, ref. num. 3) respectively for transmitting scanning signals and display signals to each pixel (col. 1, lines 40-67); a scanning signal supply circuit (Fig. 5, ref. num. 2) for supplying the scanning signals to said scanning lines (col. 1, lines 56-67); and a display signal supply circuit (Fig. 5, ref. num. 1) for supplying the display signals to the signal lines (col. 1, lines 56-67), wherein said display signal supply circuit determines a polarity of the display signal to be supplied to the reference pixel of each pixel row based on a random number of pixel rows constituting one pixel row group in one display frame (col. 9, lines 17-52).

Nishimura teaches that the number of pixel rows constituting one pixel row group is determined at random by the polarity control unit (Fig. 5, ref. num. 8), which outputs this random pattern to the display signal supply circuit which then supplies each pixel with a display signal having a polarity. This is equivalent to the display signal supply circuit determining the polarity of the display signal to be supplied to a reference pixel of each pixel row in a frame (i.e., it is only necessary to specify the polarity for one pixel in a pixel row – the polarity of each adjacent pixel in that pixel row is alternatively arranged).

Nishimura does not explicitly disclose that the display signal supply circuit determines a polarity in a frame subsequent to the predetermined random polarity frame by reversing the polarity of the predetermined random polarity frame. However, this claim limitation has been thoroughly discussed in the rejection of claim 1. Claim 12 is therefore rejected on the same grounds as claim 1.

As pertaining to **claims 13 and 14**, Nishimura teaches all of the claim limitations recited herein (see Fig. 5), and these claims are therefore rejected on the same grounds as claim 12.

As pertaining to **claim 16**, Nishimura teaches all of the claim limitations recited herein with the exception of explicitly disclosing in this embodiment (Embodiment 5) that the display signal supply circuit supplies the display signals whose polarities are reverse to those of a predetermined frame in a frame immediately after said predetermined frame. However, this claim limitation has been thoroughly discussed in the rejection of claim 1. Claim 16 is therefore rejected on the same grounds as claims 1 and 15.

As pertaining to **claim 17**, Nishimura discloses a driving method of a liquid crystal display device in which the polarity of a voltage applied to each pixel is changed for each frame (col. 9, lines 17-52), the method comprising the steps of: applying voltages of polarities based on random numbers for a first frame (col. 9, lines 17-52).

Nishimura does not explicitly disclose applying voltages of polarities reverse to those of the first frame for a second frame immediately after the first frame. However, this claim limitation has been thoroughly discussed in the rejection of claim 1. Claim 17 is therefore rejected on the same grounds as claim 1.

As pertaining to **claim 18**, the limitations recited herein are repeated (using alternative language) from claim 9. Claim 18 is therefore rejected on the same grounds as claims 17 and 9.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Cole (US 6,469,684) discloses random polarity inversion circuitry for a display device.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robin Mak whose telephone number is 703-305-2099. The examiner can normally be reached on Monday-Friday: 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on 703-305-4709. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

rcm
8/27/04

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